

# Chronic obstructive pulmonary disease case finding by community pharmacists: a potential cost-effective public health intervention

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## Keywords

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## Abstract

**Objectives** This study aims to pilot a community pharmacy chronic obstructive pulmonary disease (COPD) case finding service in England, estimating costs and effects.

**Methods** Patients potentially at risk of COPD were screened with validated tools. Smoking cessation was offered to all smokers identified as potentially having undiagnosed COPD. Cost and effects of the service were estimated.

**Key findings** Twenty-one community pharmacies screened 238 patients over 9 months. One hundred thirty-five patients were identified with potentially undiagnosed COPD; 88 were smokers. Smoking cessation initiation provided a project gain of 38.62 life years, 19.92 quality-adjusted life years and a cost saving of £392.67 per patient screened.

**Conclusions** COPD case finding by community pharmacists potentially provides cost-savings and improves quality of life.

## Introduction

With just under 1 million cases of chronic obstructive pulmonary disease (COPD) in England, the direct cost to the NHS is estimated to be £900M.<sup>[1]</sup> Treating late stage COPD is believed to cost 10 times more than moderate disease,<sup>[2]</sup> and consequently interventions that prevent progression are likely to realise significant healthcare savings.

COPD is a progressive degenerative disease that can be checked if the underlying cause, e.g. smoking is removed. It is estimated that there are 2.8 million undetected cases of COPD in the UK and if these remain undiagnosed or are diagnosed late, this is predicted to cost the NHS £3.22 Billion.<sup>[3]</sup>

One approach to early detection is case-finding which consists of screening people at risk of COPD using a symptom questionnaire<sup>[4]</sup> and spirometry test to evaluate lung function.<sup>[5]</sup> Although such an approach by general practitioners in the UK has been demonstrated to be effective<sup>[6]</sup> and a similar model has been piloted in community pharmacy in Spain,<sup>[7]</sup> it has not been tested in community pharmacy in the UK.

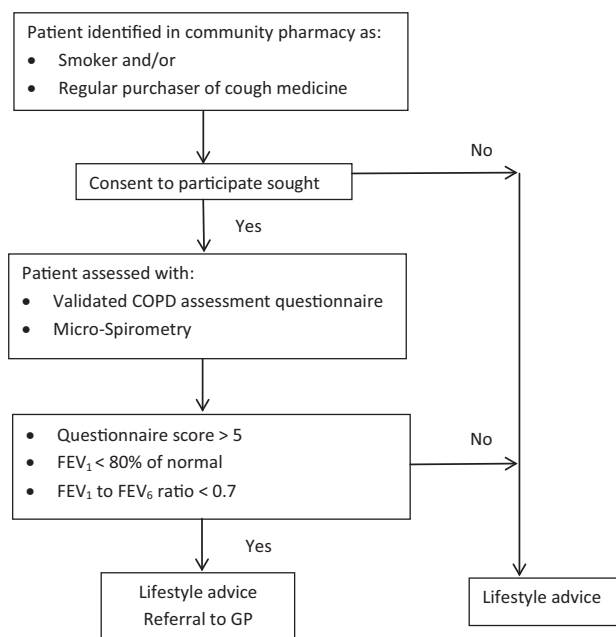
The aim of this service evaluation was to deliver a COPD case finding service in a range of community pharmacies in England and estimate the cost and effects associated with its delivery.

## Methods

Approval for the service evaluation was obtained from the University ethical committee. Twenty-one community pharmacies within the Wirral area, representing four large multiple companies, delivered the case finding service from September 2012 until April 2013. Figure 1 summarises recruitment and assessment processes used within the study.

The validated disease risk assessment questionnaire<sup>[4]</sup> used ascertained the following:

- age over 35;
- whether smoked at least 100 cigarettes in entire life;
- number of times short of breath in previous four weeks;
- whether they ever cough up mucus or phlegm; and
- whether breathing problems affect usual activities.



**Figure 1** Summary of recruitment and assessment process.

With each response graded out of 2, a score of greater than 5 (84.4% sensitivity, 60.7% specificity for diagnosis of moderately severe COPD) resulted in general practitioner (GP) referral.

Micro-spirometry (use of hand-held spirometers) was used to determine amount of air forcibly exhaled (forced expiratory volume) at 1 and 6 seconds ( $FEV_1$  and  $FEV_6$ ). An  $FEV_1$  to  $FEV_6$  ratio of less than 0.7 (diagnosis criteria for COPD<sup>[5]</sup>) or  $FEV_1$  less than 80% of what would be predicted to be normal (indicative of moderately severe COPD<sup>[5]</sup>), also resulted in GP referral. Patients were given lifestyle advice, signposted to or offered smoking cessation support (nature of which was dependant on local arrangements) and/or referred to their GP.

Number of assessments, patient demographics and the results from the assessments were recorded.

The projected costs and effects associated with the service were estimated utilising the following assumptions:

- Patients identified with COPD were at GOLD stage 2 (moderate severity).<sup>[5]</sup>
- Life time cost savings from stopping smoking amounted to £1062 per patient while gains of 0.45 life years and 0.23 quality-adjusted life years (QALYs) would be realised assuming 33% smoking cessation success rate in those who were identified.<sup>[8]</sup>

## Results

Two hundred thirty-eight patients identified as either smokers or regular purchasers of cough medicines consented

to be screened, 141 (59.2%) were women and the mean age was 51.2 years.

One hundred twenty four (52.1%) of those screened were current smokers of which 84 (67.7%) expressed an interest in smoking cessation.

One hundred thirty-five (56.7%) of those screened were identified at risk of COPD (71 questionnaire, 85  $FEV_1$  ratio < 80% and 39  $FEV_1$  < 0.7) and 88 (65.2%) of which were current smokers. 34 (38.6%) of the current smokers refused smoking cessation service, 16 (18.2%) received a smoking cessation service from the pharmacist in-house, whereas 30 (34.1%) were referred to an external service. For eight (9.1%) patients data were not available. An additional nine patients, not identified at risk of COPD, undertook smoking cessation service in-house and 14 were referred.

General lifestyle advice was given to 150 patients of which 98 (65.3%) was related to smoking, 32 (21.3%) diet and nutrition, 51 (34.0%) physical activity, 17 (11.3%) alcohol, 11 (7.3%) weight management and 19 (12.7%) other.

Based on assumptions stated in the method, in the 88 patients at risk of COPD who were smokers, possible net cost savings of £93 456 were estimated within the project with a total lifetime gain of 38.62 life years and 19.92 QALYs. The cost saving per patient screened is therefore £392.67.

If the proportion identified at risk in the pilot study held nationally then with a per pharmacy capture rate of 50 within 11 100 pharmacies, then this would yield 205 175 patients at risk and actively smoking realising £214.7 million in savings, 90 052 life years and 46 448 QALYs.

## Discussion and Conclusion

This evaluation shows that community pharmacists can effectively undertake case finding of COPD and that a method of targeted screening identifies one patient with moderate severity COPD for every two screened. This ratio may vary depending on geographical location and such services may be more cost-effective in areas of known high COPD prevalence.

Although the number of type of pharmacies improves the generalisability of the results, this is service evaluation and consequently the effect of not providing the service is unknown. Additionally, estimates of costs and effects are derived from theoretical economic models based on assumptions that may not accurately reflect reality.

The simple cost analysis that is based on the smoking cessation element alone however suggests that providing the cost per patient screened is less than £400 than the service should be adopted by the NHS. With the transition from moderate to severe COPD estimated to cost the NHS £1000 per patient per year<sup>[3]</sup> and the productivity losses from COPD estimated at £819.66 per patient per year<sup>[9]</sup> early identification from the cases-finding service will realise additional savings to both

the NHS and society. The service additionally identified-smokers without COPD who were willing to consider and access smoking cessation services.

The results from this service evaluation strongly suggest that if the results were replicated nationally, a pharmacist delivered COPD case finding service could potentially provide significant NHS and societal benefits is likely to be cost-effective and therefore should be adopted.

## Declarations

### Conflict of interest

The Author(s) declare(s) that they have no conflicts of interest to disclose.

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### Authors' contributions

DW contributed in data analysis and presentation, and paper preparation. MT contributed in paper preparation, commented on and contributed to revisions. TT led the evaluation work stream of the project and commented on all versions of the paper. All Authors state that they had complete access to the study data that support the publication.

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